

## CLAIMS

1. An insulating film comprising a compound having a borazine skeleton in a molecular structure thereof, and having a specific dielectric constant of no greater than 2.6, a Young's modulus of 5 GPa or greater and a leak current of no greater than  $1 \times 10^{-8}$  A/cm<sup>2</sup>.

2. An insulating film according to claim 1,  
wherein the insulating film is formed from a borazine-based resin composition with a metal impurity content of no greater than 30 ppm.

3. An electronic part provided with a conductive layer-formed substrate and an interlayer insulating film formed on the substrate,

wherein the interlayer insulating film is composed of an insulating film according to claim 1 or 2.

4. A composite insulating film comprising:  
a first insulating film comprising a siloxane resin, and  
a second insulating film formed on the first insulating film and comprising a compound having a borazine skeleton in a molecular structure thereof.

5. A composite insulating film according to claim 4,  
wherein the first insulating film is composed of a siloxane resin composition comprising a siloxane resin obtained by hydrolytic condensation of a compound represented by the following formula (1):



where

X<sup>1</sup> represents an H atom, an F atom, a group containing a B atom,

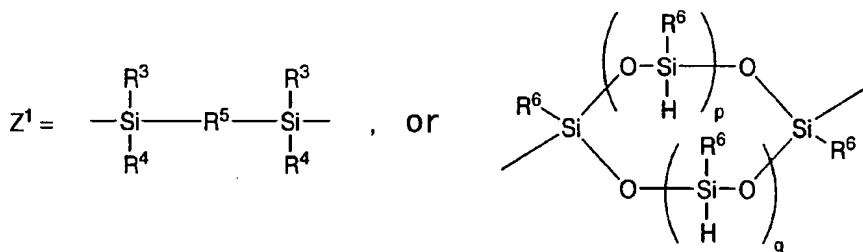
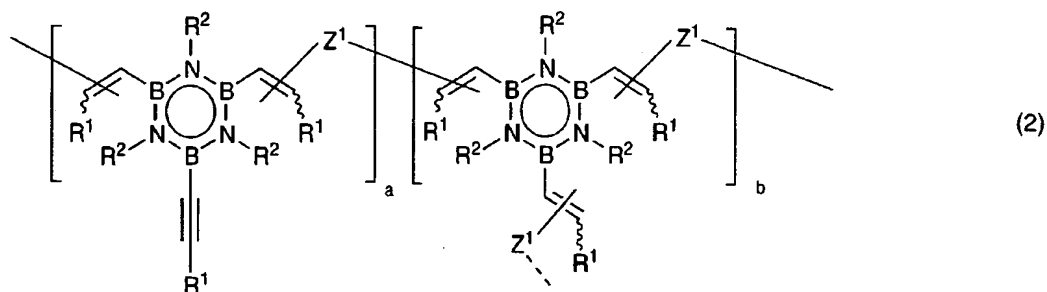
N atom, Al atom, P atom, Si atom, Ge atom or Ti atom, or an organic group of 1 to 20 carbons,

$X^2$  represents a hydrolyzable group, and

$n$  represents an integer of 0-2, with the proviso that when  $n$  is 2, each  $X^1$  may be the same or different, and when  $n$  is 0-2, each  $X^2$  may be the same or different.

6. A composite insulating film according to claim 4 or 5,

wherein the compound having a borazine skeleton in a molecular structure thereof has a repeating unit represented by the following formula (2):



where

$R^1$  represents alkyl, aryl, aralkyl or hydrogen,

$R^2$  represents alkyl, aryl, aralkyl or hydrogen,

$R^3$  and  $R^4$  represent identical or different monovalent groups selected from among alkyl, aryl, aralkyl and hydrogen,

$R^5$  represents a substituted or unsubstituted aromatic divalent

group, an oxypoly(dimethylsiloxo) group or oxygen,

$R^6$  represents alkyl, aryl, aralkyl or hydrogen,

a represents a positive integer, b represents 0 or a positive integer,

p represents 0 or a positive integer, and q represents 0 or a positive integer.

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7. An electronic part provided with a composite insulating film according to any one of claims 4 to 6,

wherein the composite insulating film is formed on a substrate.

8. A process for production of a borazine-based resin that is a polymer having a borazine skeleton on a main chain or a side chain thereof,

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wherein the process comprises:

a first step of polymerizing a B,B',B''-trialkynylborazine and a hydrosilane in the presence of a solid catalyst, and

a second step of removing the solid catalyst after completing the first step.

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9. A process for production of a borazine-based resin according to claim 8,

wherein the solid catalyst is a supported catalyst comprising a catalyst supported on compound-based carrier.

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10. A process for production of a borazine-based resin that is a polymer having a borazine skeleton on a main chain or a side chain thereof,

wherein the process comprises:

a first step of polymerizing a B,B',B''-trialkynylborazine and a hydrosilane in the presence of a metal catalyst in a polymerization

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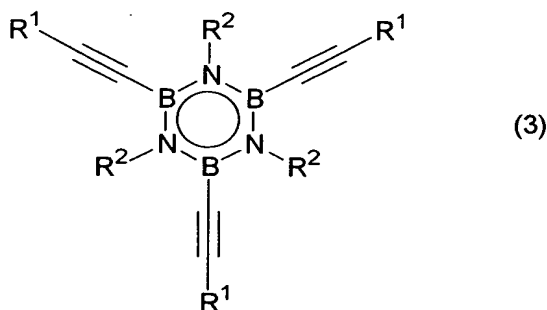
solvent,

a second step of adding to the polymerization system a particulate scavenger which is insoluble in the polymerization system of the first step and adsorbs the metal component from the metal catalyst, after completion of the first step, and

a third step of filtering out the scavenger to which the metal component has been adsorbed after completion of the second step.

11. A process for production of a borazine-based resin according to any one of claims 8 to 10,

wherein the B,B',B''-trialkynylborazine is represented by the following formula (3):



where

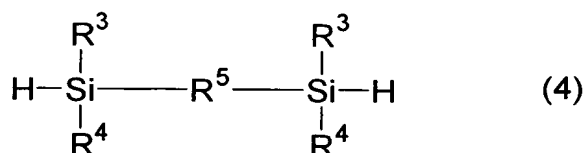
R¹ represents alkyl, aryl, aralkyl or hydrogen, and

R² represents alkyl, aryl, aralkyl or hydrogen.

12. A process for production of a borazine-based resin according to any one of claims 8 to 10,

wherein the hydrosilane is represented by the following formula

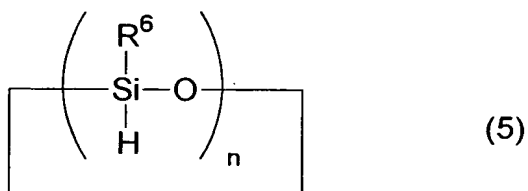
(4):



where

$R^3$  and  $R^4$  represent identical or different monovalent groups selected from among alkyl, aryl, aralkyl and hydrogen,

$R^5$  represents a substituted or unsubstituted aromatic divalent group, an oxypoly(dimethylsiloxo) group or oxygen,  
 5 by the following formula (5):



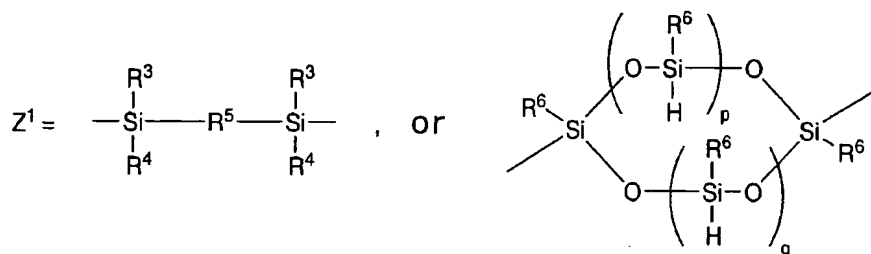
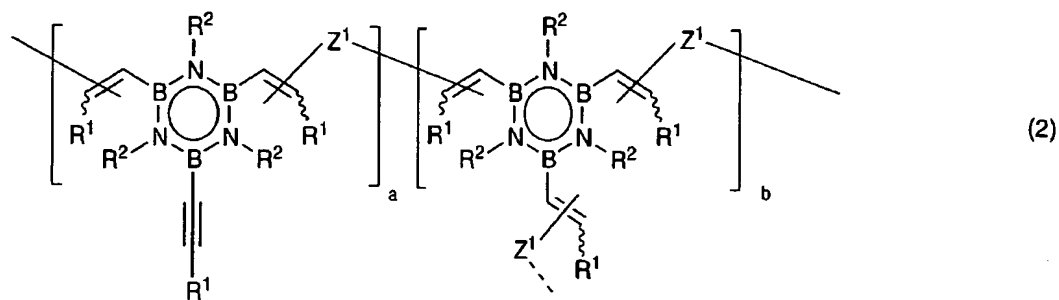
where  $R^6$  represents alkyl, aryl, aralkyl or hydrogen, and  $n$  represents an integer of 2 or greater.

10 13. A borazine-based resin composition comprising a polymer with a borazine skeleton on a main chain or a side chain thereof, and a solvent capable of dissolving the polymer, and having a solid concentration of 0.5 wt% or greater and a metal impurity content of no greater than 30 ppm.

15 14. A borazine-based resin composition according to claim 13, wherein the polymer is a borazine-based resin produced by a borazine-based resin production process according to any one of claims 8 to 12.

15 15. A borazine-based resin composition according to claim 13 or 14,

20 wherein the polymer has a repeating unit represented by the following formula (2):



where

$\text{R}^1$  represents alkyl, aryl, aralkyl or hydrogen,

$\text{R}^2$  represents alkyl, aryl, aralkyl or hydrogen,

5  $\text{R}^3$  and  $\text{R}^4$  represent identical or different monovalent groups selected from among alkyl, aryl, aralkyl and hydrogen,

$\text{R}^5$  represents a substituted or unsubstituted aromatic divalent group, an oxypoly(dimethylsiloxo) group or oxygen,

$\text{R}^6$  represents alkyl, aryl, aralkyl or hydrogen,

10 a represents a positive integer, b represents 0 or a positive integer, p represents 0 or a positive integer, and q represents 0 or a positive integer.

16. A method for forming an insulating film on a substrate,

15 wherein a borazine-based resin composition according to any one of claims 13 to 15 is coated onto the substrate to form a coated film, and the coated film is then dried.

17. An insulating film provided on a substrate, the insulating

film being formed by a method for forming an insulating film according to claim 16.

18. An insulating film according to claim 17,

5 wherein the insulating film is formed between mutually adjacent conductive layers among a plurality of conductive layers provided on the substrate.

19. An electronic part comprising an insulating film according to claim 17 or 18.

10 20. A borazine-based resin produced by a borazine-based resin production process according to any one of claims 8 to 12.